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Experimental Inquiries relative to the Distribution and Changes of the Magnetic Intensity in Ships of War. By George Harvey, *Esq. Communicated by* John Barrow, *Esq. F.R.S.* Read Feb. 26, 1824. [*Phil. Trans.* 1824, *p.* 310.]

This paper contains the details of experiments made on board several vessels, with a view of determining the influence of the iron in the ships upon the compass under different circumstances and situations. The instrument used for determining the intensity consisted of a magnetized cylindrical bar, 2·5 inches long and three eightieths of an inch diameter, delicately suspended by a single fibre of the silkworm, to the extremity of an adjusting screw, which worked in the cap of the glass vessel inclosing the bar. A brass wire also passed through the cap for the purpose of placing the bar at right angles to the magnetic meridian previous to its being put into a state of oscillation.

On the days devoted to the experiments on ship-board, the time of making 50 vibrations of the bar was determined in the centre of a meadow, of which the substratum was dry slate, by a mean of six sets of experiments, the time being accurately registered to quarter seconds. The instrument was then taken on board, and placed in succession at the different stations of the ship, and the mean of six sets of experiments determined at each station with the same precautions as on land. The times, says the author, of performing the oscillations on shore, and at each of the assumed points in the ship, necessarily gave the magnetic intensity at each station in terms of the terrestrial intensity, which in this case was represented by 100.

Experiments on the Elasticity and Strength of Hard and Soft Steel. In a Letter to Thomas Young, *M.D. For. Sec. R.S. By Mr.* Thomas Tredgold, *Civil Engineer.* Read March 25, 1824. [*Phil. Trans.* 1824, *p.* 354.]

The bars of steel used in these experiments were supported at the ends by two blocks of cast iron, resting upon a wooden frame, and a scale for weights was suspended from the middle of the length of the bar, by a cylindrical steel pin, three eighths of an inch in diameter. To measure the flexure a quadrantal piece of mahogany was attached to the frame, with a vertical bar sliding in two guides at its edge, and moving an index. The bar and index were so balanced, that one end of the bar bore with constant pressure upon the specimen, and the graduated arc was divided into inches, tenths, and hundredths. The thousandths were measured by a vernier. A bar of blistered steel of file hardness, 13 inches long between the supports, underwent no permanent alteration of form when loaded with 110lbs. The temper of the bar was then successively lowered, and it was ultimately again hardened; but in these different states its flexure and resistance to permanent change of form remained the same.